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FOREST PEST MANAGEMENT

BIOLOGICAL EVALUATION R2-82-2

WESTERN TENT CATERPILLAR

Pagosa Ranger District
San Juan National Forest

MARCH 1982

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Forest Pest Management
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INTRODUCTION

Each year since 1977, several thousand acres of aspen on the San Juan National Forest and adjacent private lands have been defoliated by the western tent caterpillar *Malacosoma californicum* (Packard). In June 1981 an aerial survey of the area determined that the defoliated area (Fig. 1) had increased from 18,000 acres in 1980 to 27,000 acres in 1981.

BIOLOGY OF THE WESTERN TENT CATERPILLAR

The western tent caterpillar has one generation per year. From mid July to early August the adult female lays eggs in grey or brown masses encircling small branches of the host trees. Larvae develop in the egg and overwinter in this form. In the spring larval emergence is closely timed with bud burst. Larvae spin tents where they rest and molt between feedings. As they molt their colors and patterns emerge from dull black to black with blue and yellow markings around a dorsal white stripe. In 30 to 42 days the larvae mature, spin a loose cocoon either on the host tree or in the duff at the base of the tree and pupate. The buff colored adults emerge in 12 to 18 days.

EVALUATION METHODS

An egg mass survey was conducted in July 1981 to gather data for predicting the 1982 tent caterpillar population level. In June late instar larvae were collected from several sites within the defoliated area. These larvae were brought to the laboratory and were microscopically examined for the presence of virus.

Two 30-inch branches were pruned from the upper crown of each sample tree. Three trees were sampled from each area. Each branch was carefully examined for western tent caterpillar egg masses and the quantity of egg masses on each branch was tallied.

RESULTS AND DISCUSSION

The results of the egg mass survey shown in table 1 indicate that the potential for heavy defoliation does exist in 1982. A nucleopolyhedroses virus is in the population. This was determined through the microscopic examination of larvae collected from several sites.

FIGURE 1: WESTERN TENT CATERPILLAR DEFOLIATION
SAN JUAN NATIONAL FOREST
PAGOSA DISTRICT, 1981

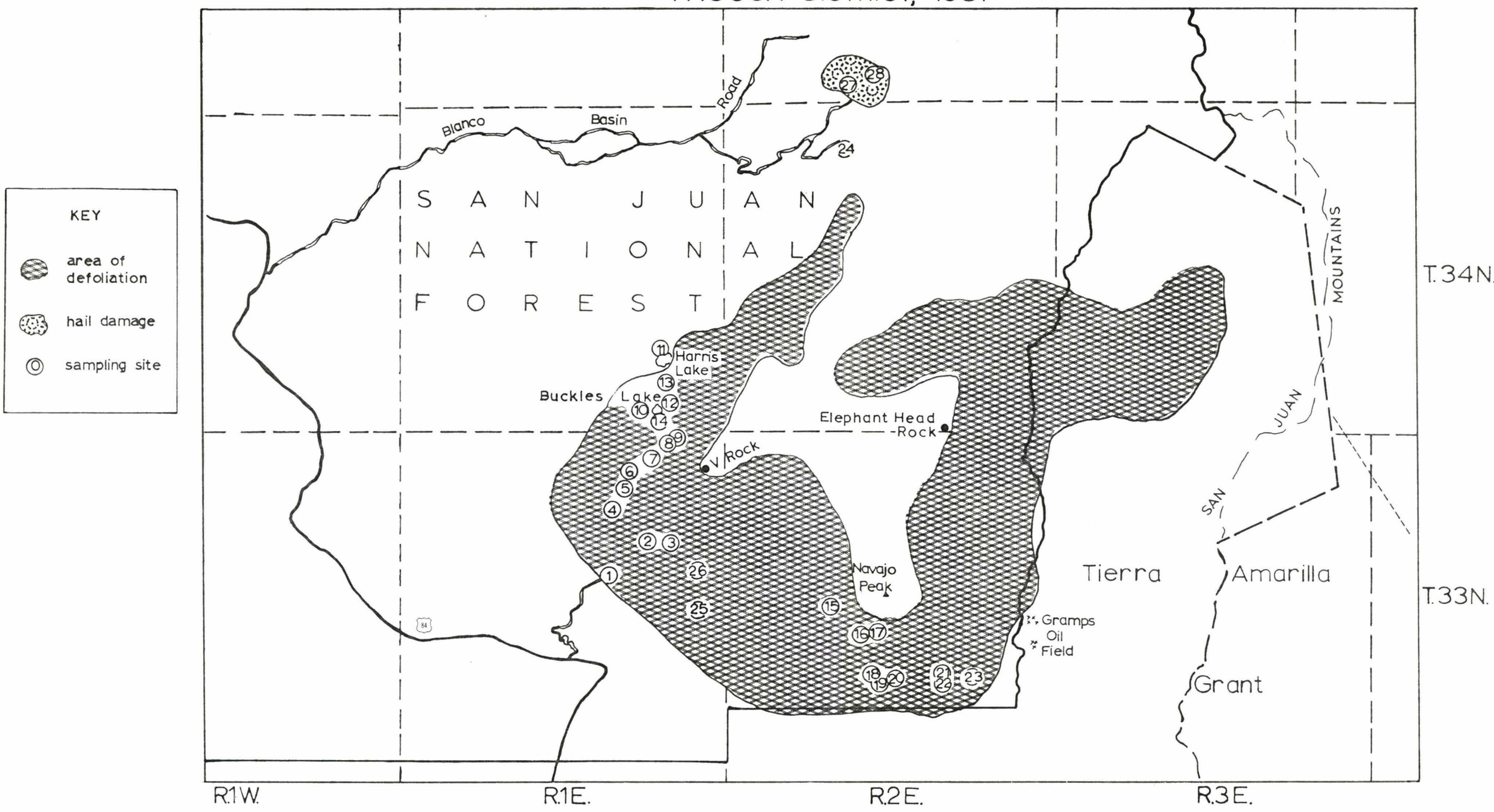

TABLE 1. A Summary of Western Tent Caterpillar Egg Mass Samplings On the Pagosa Ranger District, 1977-1981

	1977	1978	1979	1980	1981
Number of Trees Sampled	34	37	88	88	84
Total Number of Egg Masses Discovered	192	147	422	622	454
Average Number of Egg Masses Per Two Branch Sample	2.84	1.97	2.40	3.28	3.21
Standard Error	0.47	0.47	0.25	0.33	0.39
Confidence Limits	± 0.96	± 0.81	± 0.50	± 0.65	± 0.77
Defoliation	Heavy	Heavy	Heavy	Heavy	Heavy[1]

[1] Predicted Heavy in 1982

In the southwestern portion of the infested area, south of V-rock, many of the trees did not refoliate after incurring total defoliation this year. Many of these trees will probably die before budbreak this spring. Among those trees that have been defoliated for several successive years and that did refoliate, the second foliage flush was unusually sparse indicating that they are in a weakened condition. The stress upon the insect from the reduction in food due to reduced leaf flush in 1982 plus the presence of virus makes the collapse of this insect in southern portions of the infestation quite probable in 1982.

ALTERNATIVE ACTIONS

Alternative 1 - Take no action.

This allows the tent caterpillar outbreak to run its' course. Natural controls will eventually suppress the caterpillar population. It assumes damage to the aspen stand is tolerable. Total damage to the stand can be measured and recorded for future reference.

Alternative 2 - Suppress the outbreak with an aerial application of chemical insecticide.

Several chemical insecticides (carbaryl, diazinon, acephate) are registered for use against the western tent caterpillar. An aerial application of a chemical pesticide may cost $6-8 per acre. Applied properly, an insecticide application should substantially reduce defoliation without excessive environmental risk.

Alternative 3 - Suppress the outbreak with an aerial application of the microbial *Bacillus thuringiensis*.

Several formulations of *Bacillus thuringiensis kurstaki* (B.t.) are registered for use against the western tent caterpillar. An aerial application of B.t. should substantially reduce defoliation without environmental risk. *Bacillus thuringiensis kurstaki* is only toxic to insects in the order Lepidoptera (butterflys and moths). An aerial application of B.t. may cost $8 to $10 per acre, slightly more than a chemical insecticide.

RECOMMENDATIONS

Most of the trees in the infested area have undergone heavy defoliation each year since 1977 and their vigor has been severely reduced. An effort to suppress the tent caterpillar in these areas may do little to save these trees or reduce the insect population which already may be on the verge of collapse.

In recent years the defoliated area has increased to the north (northeast of Harris Lake) and in this area, the trees appear to be in good condition. Egg mass counts indicate that heavy defoliation will occur in this area again in 1982. If management objectives, timber values, and aesthetic values warrant suppression, then Alternative 3 could adequately achieve foliage protection and insect population reduction in this area with minimal environmental impact.